FROM HORSE CAR TO THE TROLLEY

Story of the Wonderful Development in Electric Traction During the Past Twenty Years.

PASSING OF STEAM TRACTION

Gradual Elimination of Distance Through the Development of the Electric Locomotive—Chicago to New York in Ten Hours.

During the summer of 1887, there appeared in the New York Sun the following facetious news item:

"They tried an electric car on Fourth avenue yesterday. It created an amount of surprise and consternation from Third St. to One Hundred and Seventeenth St. that was something like that caused by the first steamboat on the Hudson. Small boys yelled "dynamite!" and "rats!" and made similar appreciative remarks until they were hoarse. Newly-appointed policemen debated arresting it, but went no further. The car horses which were met on the other track kicked without exception, as was

First Electric Railway of the World, Berlin Exposition, 1879.

natural, over an invention which threatens to relegate them to a sausage factory."

That was less than twenty years ago. Today the New York Central Railroad Company is expending $50,000,000 in the electrification of the first thirty-five miles of its system, and the car horses were long ago relegated to the boneyard, if not to the "sausage factory."

"They" have done marvelous things since the increasing knowledge of electricity opened up a new world of achievement, and we have scarcely crossed the threshold. In 1880 the electric car was a dream; in 1890, an experiment; in 1900, a great and wonderful fact which is revolutionizing passenger transportation and will enable human beings to move from place to place twice as fast as they do at present.

Born in Old Vermont.

When in 1834 Thomas Davenport, of Brandon, Vt., ran a toy motor mounted on wheels on a small circular railway, the modern electric railroad with its possible speed of over one hundred miles an hour was born.

In 1838 Robert Davidson, of Aberdeen, Scotland, built an electric locomotive which actually reached a speed of four miles an hour on the Edinburgh-Glasgow railway. Nine years later Professor Moses G. Farmer operated an experimental car which carried two passengers at Dover, New Hampshire.

Then the United States congress became interested. By special grants Professor Page of Smithsonian institute was aided in the construction of several forms of motors. One of them was used as a locomotive and, driven by a battery of one hundred Grove elements, was tried April 29, 1851, on a railroad running from Washington to Bladensburg. A speed of nineteen miles an hour was developed, so great that it destroyed the batteries.

Numerous other experiments followed, all commercial failures because the motors were crude and the source of power a primary battery. The development of the wonderful modern dynamo was necessary before electric railroading could become a commercial success. The first great step was in 1860, when an Italian named Pacinotti invented a continuous current dynamo. Three years later the first practical commercial machine for continuous current operation was made by Gramme.

Still the modern electric car was impossible. The "reversibility of function" had yet to be discovered, involving electrical transmission of energy through two machines, one driven by power and generating electricity; the other reversing the operation, receiving electricity and developing mechanical power.

Like many other important discoveries, this is said to have been the result of accident. A workman coupled a machine to a live circuit by mistake and was greatly astonished to see it begin to rotate. This reversibility of function was publicly demonstrated for the first time at the Vienna exposition in 1873.

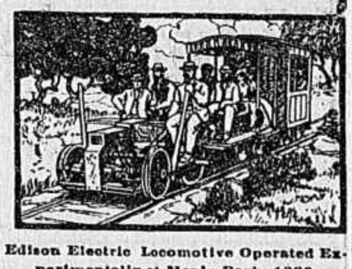
Not until 1879 was the first electric railway put in operation, taking the current from a dynamo, using a modern motor and carrying passengers. This novelty was in operation at the Berlin exposition and was a mile and two-thirds, in length. The train consisted of a small locomotive and three small cars, capable of carrying twenty people. It reached a speed of eight miles an hour.

About this time Stephen D. Field and Thomas Edison in the United States began experimenting. In 1880 Edison was operating at Menlo Park an electric locomotive which pulled two cars.

The First Electric Railroad.

The first regular electric line to be established was at Lichterfelde, Germany, near Berlin. It was only a mile and a half in length and opened for traffic in May 1881. The trains carried twenty-six passengers, at a maximum speed of thirty miles an hour.

The first electric car to be operated regularly in the United States was installed by Deft on the Hamden branch of the Baltimore Union Passenger Railway in August, 1886. That was barely twenty years ago. So great as the skepticism of the public and railway men generally that the contract under which the road was built withheld payment one year so that it might be determined whether the cars would run. "No one but a knave or a fool would undertake such a thing," said a well known scientist at the time. Scientists sometimes have trouble keeping up with the procession. About the same time small cars were operated by Van Derpoele at South Bend, Ind., followed by other small roads in



Edison Electric Locomotive Operated Experimentally at Menlo Park, 1880.

Windsor, Canada; Appleton, Wis.; Port Huron, Mich.; Scranton, Pa., and Montgomery, Ala. In the autumn of 1884 Frank L. Sprague, whose name is inseparably connected with electric traction, began to attract attention with his motors.

Twenty Years of Achievement.

At the beginning of 1887 there were in the whole world less than sixty miles of electric railroad track, and only about one hundred motors and motor cars. In 1905 there were nearly thirty thousand miles of electric track in the United States alone.

This change was not accomplished without opposition, discouragement and financial difficulties. Mr. Sprague himself, who was so potent a factor in working this change, has told the story of his first important contract. In the spring of 1887, the Union Passenger Railway company of Richmond, Va., engaged him to build an electric railway. The first car was run out one night while the skeptical people slept, to make sure it could climb the hills. It started out in a blaze of glory and ignominiously was towed back again by four big mules. But Sprague persisted until on Feb. 2, 1888, in a drizzling rain, the road opened for business.

From that time forward the future of electric railroading was assured and events moved rapidly. City after city adopted the new motive power; horse cars became things of the past; interurban roads began to gridiron the country everywhere, and in each instance a commercial success was scored. Electric interurban lines have been money makers from the start.

The greatest development has been in the east; but the west is not far behind. The Aurora, Elgin and Chicago Electric railway (the third-rail system) which has been in operation several years, is famous. From one central power station over two hundred miles of road are operated, or will be as soon as the line to Belvidere is completed. Electricity at wholesale is sold to cities and villages along the route for lighting purposes; electricity for power is sold to farmers. Trains of elegant cars run into Chicago at a speed which would have seemed impossible a few years ago. Passengers wave good bye to steam trains on a paralleling railroad, which they pass easily. A parlor and dining car is one of the luxuries which the suburbanites enjoy going to and from the city, and the railroad seems a veritable gold mine for its owners.

The horse car has long since disappeared. Will the iron horse, the great steam locomotive, be supplanted also? This question occurs to all who can see the significance of passing events. Probably not for many years to come, as far as heavy freight traffic is concerned, because steam is especially applicable to the hauling of freight. But the action of the New York Central in electrifying thirty-five miles of its road leading out of New York, and the popular agitation for similar improvement in Chicago and elsewhere, would seem to point to a time not far distant when electric railroads will connect distant cities and greatly shorten the hours of travel.

Chicago to New York in Ten Hours.

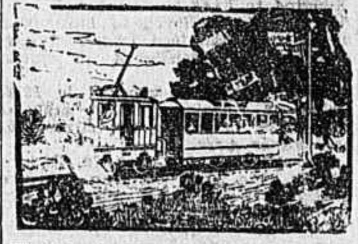
In fact such a railway already is being built between Chicago and New York by the Chicago-New York Electric Air Line Railroad company, of Chicago. This company, headed by a group of practical railroad men, proposes to run limited trains, taking not more than three stops, through to New York or Chicago, in ten hours. The thought fairly takes one's breath away at first, but the project considered soberly seems practical enough, and certainly is "a consummation devoutly to be wished." The work of grading began Sept. 1 near LaPorte, Ind.

As the new road will be an air line, with few curves, the route surveyed is 160 miles shorter than the Pennsylvania "Short Line", and 230 miles shorter than the Lake Shore and New York Central, each of which runs trains covering the distance in eighteen hours. Taking into consideration the shorter route of the Air Line, this is equivalent to a fourteen-hour service. With low grades, a straight track and no grade crossings, the seventy-five miles an hour average necessary to a ten-hour service ought easily to be maintained. Even on the first class steam roads of today ninety miles an hour is not uncommon for short distances.

The Scientific American of Feb. 18, 1905, speaking editorially of the New York Central experiment, says, "The success of this installation, of which there can be no doubt whatever, marks the first step in the gradual substitution of the electric for the steam locomotive in the operation of long distance express trains." The Chicago-New York project may be regarded the second step.

Mr. Sprague himself says that speed is "a matter of finance." "What then will determine the future?" he asks. "Chiefly the financial factor, as it must the future of any other great industrial problem. When savings in operation and the increased return for traffic will more than pay a fair dividend on money invested for electrical equipment, will trunk lines be operated by electricity."

Professor Charles P. Steinmetz, one of the greatest authorities on electricity, is quoted as saying, "There is no limit to the speed that may be developed in electric traction—that is, there is no limit up to 150 or 200 miles an hour. Higher speed than that the car wheels could not stand. They would fly to pieces from centrifugal force. Not only can a speed of 120 miles an hour be maintained on a train equipped with electricity, but in



First Regular Electric Railway in United States, Baltimore, 1886.

my opinion it is an entirely feasible scheme from the commercial point of view."

At any rate, the world seems on the eve of great things, and no scientist dares say today as was said twenty years ago, "a man is a knave or a fool." The attitude of the American public is one of faith and expectancy, best expressed by a recent remark of an old lady in her last sickness:

"I don't want to die," she said, "I want to see what they are going to do."

THE AMERICAN QUEEN.

Woman in Our Family and Public Life Described for German Readers.

Among the most striking and novel features of American life is the position of woman. This is briefly but comprehensively described in the phrase, wholly un-European. The European woman is, first of all, a wife and mother. In Germany the home is the foundation of the family, and so, in an extended sense, of the great nation family of the state. The man considers it his most precious privilege to be protector and provider to his wife and children; the more faithfully he performs this function, the more solicitously the woman keeps his home and brightens it with the most precious characteristics of her sex.

To Yankeeland this restricted conception of the family and State is strange. The American man is the money-maker of the household, and nothing more. But today the struggle for the dollar is not half so fiercely strenuous as the battle for the franc, the mark, the shilling. In Dollarica men become rich, or, at least, well to do in a rush. The natural result is that in the family partnership in the well-to-do classes the woman's responsibilities as wife and mother are not great. She does not have to toil ceaselessly, sweeping and cooking, because she can hire others [illegible]. She [illegible] turn [illegible] time [illegible] is liberally [illegible] money. Of course, [illegible] cases in all middle-class families, [illegible] it is in [illegible] The woman [illegible] all expensive [illegible] rather than an important cog in its machinery.

Out of these circumstances the position of the American woman, at home and in public, has developed so that she is a queen whom the man serves with devoted zeal, and whose gracious smile he values as the best reward of his efforts. Lamprecht rightly speaks of an almost mediaeval reverence for women in America. * * * Mamma's wish is law. Mamma is tired of arguing with the imported help. Papa must give up his home and take his family to a hotel. Mamma takes her daughters to the country for the summer. Papa can come out for the week-end; and he's suited, for he, the dollar maker, doesn't know what to do with himself away from town. Some fine day mamma packs up and takes the girls off for a year in London or Paris—it's up to papa to send the checks. "Ladies first" is an almost sacred motto in the United States—more than anywhere else. Another is: "Never contradict a lady," and however false a statement made by a lady in conversation may be, no man will contradict her. It would be "bad manners." He would be no "ladies' man."

The press, in America the servant of public opinion and the ruler of the people, takes its keynote from the universal chorus in praise of woman. The great trinity that governs the newspapers is the dollar, politics, and woman. To "the great American woman" leading articles are constantly devoted. She is continually exalted as the most beautiful, wise, and charming woman in the world. Woe to him who does not add his voice to this chorus of praise! * * * In the schools of America, too, woman plays a part in which she is not seen in Europe. The education of boys is almost entirely the work of women, who train them to the national respect for women. The position of the sex appears still more plainly in the much-talked-of coeducation. * * * The result is that the American man is nervous almost to the point of hysteria, like a woman, always going to extremes; and his conduct and his tastes are feminized. He seldom has the fine, strong masculinity of the German man.—New York letter to a Berlin paper.

AUTO WITHOUT SMELL

Two Schenectady Mechanics Invent an Automobile That Will be Propelled by Springs

It will be but a short time before the whirr of the engine and the smell of gasoline will be things unknown in the automobile world. Two men from Schenectady have recently applied for a patent on a machine that has no engine, but is propelled by means of springs like a clock. The inventors are Joseph Raes of 327 Albany street, and D. L. Morse, of 1036 Albany street. Both are machinists employed at the General Electric Company in Schenectady.

The machine, in outward appearance, will resemble an ordinary automobile, but there will be no place reserved for the engine. The power will be produced by [illegible] a series of springs operated on the same principle of a clock. The springs will be [illegible] feet long, three inches [illegible] and one-sixteenth of an inch in thickness. They will be fastened to a shaft every turn of which by means of gearing, will cause the rear wheels of the machine to revolve 648 times and will drive the vehicle 4,760 feet.

The springs will be kept constantly wound up by a device that will cause them to tighten outside as they tend to unwind [illegible]. It is estimated that a spring the size of the one to be used will produce one-fifth horsepower, so with that as a basis the number of springs for [illegible] The inventors [illegible] work [illegible] if [illegible] [illegible] found for the manufacture of [illegible] Schenectady [illegible] [illegible] can be done [illegible]

MANNERS AT TABLE.

The Etiquette of Eating in the Seventeenth Century.

An account of hospitality in 1629 gives a good idea of the manner in which a country gentleman of the period lived. Dinner and supper were brought in by the servants with their hats on, a custom which is corroborated by Fynes Moryson, who says that, being at a knight's house who had many servants to attend him, they brought in the meats with their heads covered with blue caps. After washing their hands in a basin they sat down to dinner, and Sir James Pringle said grace. The viands seemed to have been plentiful and excellent—"big pottage, long kale, bowe of white kale," which is cabbage; "brach soppe," powdered beef, roast and boiled mutton, a venison pie in form of an egg, goose. Then they had cheese, cut and uncut, and apples. But the close of the feast was the most curious thing about it.

The tablecloth was removed, and on the table were put a "towel the whole breadth of the table and half the length of it, a basin and ewer to wash, then a green carpet laid on, then one cup of beer set on the carpet, then a little long lawn serviter plaited over the corner of the table and a glass of hot water set down also on the table; then be there three boys to say grace—the first, the thanksgiving; the second, the Pater Noster; the third, prayer for a blessing of God's church. The good man of the house, his parents, kinfolk and the whole company then do drink hot waters, so at supper, then to bed, the collation which (is) a stoupe of all."—Scottish Review.

BRAIN QUALITY.

It is of Just as Much Importance as the Quantity.

The brain of Daniel Webster weighed fifty-six or fifty-seven ounces, that of Napoleon Bonaparte about the same. This is about three pounds and a half. These were exceeded by the brain of Cuvier, the great French naturalist, which weighed between fifty-nine and sixty ounces, and that of the French surgeon Dupuytren, which weighed fifty-eight ounces. The average weight of the brain of man is about fifty ounces and of women forty-five ounces. The maximum weight of the healthy adult brain is about sixty-four ounces and the minimum thirty-one ounces. Men of great intellectual power have generally if not always possessed large brains. The quality of the brain is, however, quite as important as the quantity, so that a large brain does not of necessity constitute a great man. The size of the brain is not in proportion to the physical development of the body, either in animals or in man. The horse has a brain less in weight than the smallest adult human brain; that of a whale seventy-five feet long was found to weigh not quite twice as much as that of a man. Even in men there is no fixed relation between the size of the body and that of the brain. A small man may have a large brain and a big man a small brain.